Amdt. dated 3/22/05

REMARKS

By the present amendment, independent claims 3, 7, 9 and 10 have been amended

to obviate the examiner's objections thereto and/or to further clarify the concepts of the

present invention. In addition, claims 11-18 have been added. Support for the subject

matter of newly added claims 11, 13, 15, and 17 can be found at the paragraph starting

from page 12, line 26 to page 13, line 2 of the subject specification. Support for the subject

matter of newly added claims 12, 14, 16, and 18 can be found on the paragraphs starting

from page 8, line 9 to line 15, from page 11, line 19 to page 12 line 5, from page 13, line

14 to line 18, and from page 14, line 18 to line 25 of the subject specification. It is

submitted that no new matter has been added by these claims. Thus, claims 1-18 remain

pending with claims 1 and 2 withdrawn from consideration. Entry of these amendments

is believed to be in order and such is respectfully requested.

In the Action, claims 3 and 9 were rejected under the second paragraph of 35 USC

§ 112 as being indefinite. In particular, it was alleged that certain terms did not have

proper antecedent basis. Reconsideration of this rejection in view of the above claim

amendments and the following comments is respectfully requested.

In response, these two claims have been amended to adopt the suggestions

contained in the Action. Accordingly, withdrawal of the rejection under 35 U.S.C. § 112 is

respectfully requested.

Claims 1-4 and 7-10 were rejected under 35 USC § 103(a) as being unpatentable

over the newly applied patent to Kuroi et al in view of the previously cited patent to

Krivokapic et al. In making this rejection, it was asserted that the Kuroi et al patent teaches

the method as claimed except for depositing the oxide insulation in the trenches by

performing HDPCVD. The Krivokapic et al patent was then asserted to teach forming an

insulating oxide layer in a trench using HDPCVD. It was concluded that it would be

obvious to use HDPCVD in the method of the Kuroi et al patent since the Krivokapic et al

patent teaches HDPCVD is self-planarizing and thus facilitates subsequent production

steps. Reconsideration of this rejection in view of the above claim amendments and the

following comments is respectfully requested.

It is submitted that the patents to Kuroi et al and Krivokapic et al, whether taken

singly or in combination, do not teach or suggest the methods as presently claimed. More

particularly, the Kuroi et al patent does not teach or suggest, among other things, the

feature of the present invention of "etching the insulation deposited in the mask aligning

trench to remove some of the insulation while covering the insulation deposited in the

element partitioning trench by the protective mask so that the insulation deposited in the

mask aligning trench has an upper surface located lower than the upper surface of the

semiconductor substrate, prior to removing the protective mask."

As shown in Fig. 3d of the subject application, the insulation layer 51a deposited in

the mask aligning trench 50 has an upper surface located lower than the upper surface of

the semiconductor substrate 1, prior to removing the protective mask 15. In the claimed

invention, etching the insulation layer 51a is performed prior to removing the protective

mask 15 and forms a step (an alignment step) between the upper surface of the insulation

layer 51a and the upper surface of the semiconductor substrate 1. According to the

claimed methods, the insulation layer 51a deposited in the mask aligning trench 50 is

selectively etched during said etching, but the insulation in the element partitioning trench

40 is not etched due to the protective mask 15. Accordingly, it is easy to adjust height of

the alignment step as needed. In other words, it is efficient to form a large (deep)

alignment step by performing the etching, such as by a magnetron RIE. This large

alignment step can improve mask alignment accuracy.

In distinct contrast to the presently claimed invention, Figs. 4, 12, 28, and 43 of the

Kuroi et al patent show that an upper surface of insulation 2 in alignment trench 10A is

located at the same level as the upper surface of the semiconductor substrate 1, prior to

removing the resist (protective mask) 5 or 51. In particular, Fig. 3 of the Kuroi et al patent

film on the alignment trench 10A is at the same level as the upper surface of silicon nitride

film 4. Further, Fig. 4 shows that silicon oxide film 2 is dry etched so that the upper surface

of the silicon oxide film on the alignment trench 10A is at the same level of the upper

surface of the semiconductor substrate 1. After that, CMP is performed to form an

alignment step in trench 10A as shown in Fig. 5.

Therefore, the Kuroi et al patent teaches that an alignment step is formed by

performing CMP. As is known, CMP requires a long processing time for forming a large

or deep alignment step. Such a long processing time for CMP may remove, not only the

silicon oxide film 2 in the trench 10A, but also some of the upper surface of the

semiconductor substrate 1. Therefore, it is inefficient to adjust the height of the alignment

step by performing CMP.

It is submitted that the above teaching deficiencies of the Kuroi et al patent are not

supplied by the Krivokapic et al patent. More particularly, the Krivokapic et al patent merely

discloses depositing insulation by HPDCVD. However, the Krivokapic et al patent does not

teach or suggest the feature of the claimed invention of "etching the insulation deposited

in the mask aligning trench to remove some of the insulation while covering the insulation

deposited in the element partitioning trench by the protective mask so that the insulation

deposited in the mask aligning trench has an upper surface located lower than the upper

surface of the semiconductor substrate, prior to removing the protective mask." Therefore,

it is submitted the presently claimed invention is not taught by the patent to Krivokapic et

al alone or in combination with the patent to Kuroi et al.

As for the subject matter of newly added dependent claims 11-18, it is submitted

that the Kuroi et al and Krivokapic et al patents, whether taken singly or in combination, do

not teach or suggest the features set forth therein. In particular, the Kuroi et al and

Krivokapic et al patents do not teach or suggest, among other things, adjusting the height

of the step at the time of removing the film to a predetermined height that is equal to a

depth etched during subsequent processes including the patterning of the conductive film.

For the reasons stated above, withdrawal of the rejection under 35 U.S.C. § 103(a)

and allowance of claims 3-4 and 7-18 as amended over the cited patents are respectfully

requested.

Claims 5 and 6 were rejected under 35 USC § 103(a) as being unpatentable over

the above patents to Kuroi et al and Krivokapic et al in view of the patent to Schoenfeld et

al. The former two patents were applied as in the previous rejection and the latter patent

was asserted to supply the teaching deficiency of these two patents with respect to the use

of rotary grinding in a CMP process. Reconsideration of this rejection in view of the above

claim amendments and the following comments is respectfully requested.

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The above remarks relative to the teaching deficiencies of the Kuroi et al and

Krivokapic et al patents are reiterated with regard to this rejection. It is submitted that the

patent to Schoenfeld et al does not supply these teaching deficiencies. Thus, it is

submitted that the distinctions as developed above with respect to the initial rejection are

applicable to this rejection as well. Accordingly, withdrawal of the rejection under 35 U.S.C.

§ 103(a) and allowance of claims 5 and 6 over the cited patents are respectfully requested.

In view of the foregoing, it is submitted that the subject application is now in

condition for allowance and early notice to that effect is earnestly solicited.

In the event this paper is not timely filed, the undersigned hereby petitions for an

appropriate extension of time. The fee for this extension may be charged to Deposit

Account No. 01-2340, along with any other additional fees which may be required with

respect to this paper.

Respectfully submitted,

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